IN THE CLAIMS:

1. (currently amended) A computer-implemented process for correcting the exposure of improperly exposed pixels of an image, comprising using a computer to perform the following process actions:

linearly expanding the dynamic range of the intensity levels of the image pixels so as to match the full dynamic intensity range available to a desired degree, wherein said linear expansion comprises,

computing a histogram of the intensity levels of the image pixels,

computing the lowermost and uppermost intensity levels that are consistent with the overall distribution of intensity levels in the image,

computing new lowermost and uppermost intensity levels that span the full dynamic intensity range available to a desired degree, and

employing the originally computed lowermost and uppermost intensity levels and the new lowermost and uppermost intensity levels to establish a linear intensity correction transform that maps the original intensity level of each pixel in the image to a linearly expanded intensity level,

applying the linear intensity correction transform to each pixel of the image;

determining whether the linearly expanded intensity levels of the image pixels are evenly distributed; and

whenever the linearly expanded intensity levels of the pixels are determined not to be evenly distributed, applying a correction factor to the linearly expanded intensity level of each pixel in the image to produce a corrected intensity value for each pixel and evenly distributed intensity levels.

2. (original) The process of Claim 1, wherein the process action of linearly expanding the dynamic range of the intensity levels of the image pixels so as to match the full dynamic intensity range available to a desired degree, comprises an action of varying the degree to which intensity levels of the image pixels are made to match the full dynamic intensity range available between expanding the dynamic range of the

intensity levels to match the full dynamic intensity range available to no expansion at all, depending on the value of a safeness parameter.

3. (original) The process of Claim 2, wherein the safeness parameter is prescribed.

4. (original) The process of Claim 2, wherein the safeness parameter is user-specified.

5. (cancelled)

6. (currently amended) The process of Claim [[5]] 1, wherein the process action of computing the lowermost and uppermost intensity levels which are consistent with the overall distribution of intensity levels in the image, comprises the actions of:

computing the lowermost level as the level wherein,

the sum of the number of pixels exhibiting a level within a prescribed range of levels extending from lowest level possible to the unknown lowermost level, less one level, is less than the total number of pixels in the image multiplied by a tolerance factor designed to eliminate the impact of noise on the pixels intensity values, and

the sum of the number of pixels exhibiting a level within a prescribed range of levels extending from lowest level possible to the unknown lowermost level, is greater than or equal to the total number of pixels in the image multiplied by the tolerance factor; and,

computing the uppermost level as the level wherein,

the sum of the number of pixels exhibiting a level within a prescribed range of levels extending from the unknown uppermost level to the highest level possible is greater than or equal to the total number of pixels in the image multiplied by said tolerance factor, and

the sum of the number of pixels exhibiting a level within a prescribed range of levels extending from the unknown uppermost level, plus one level,

to the highest level possible is less than the total number of pixels in the image multiplied by the tolerance factor.

7. (currently amended) The process of Claim [[5]] 1, wherein the process action of linearly expanding the dynamic range of the intensity levels of the image pixels so as to match the full dynamic intensity range available to a desired degree, comprises an action of varying the degree to which intensity levels of the image pixels are made to match the full dynamic intensity range available between expanding the dynamic range of the intensity levels to match the full dynamic intensity range available to no expansion at all, depending on the value of a safeness parameter.

8. (original) The process of Claim 7, wherein the process action of computing new lowermost and uppermost intensity levels that span the full dynamic intensity range available to a desired degree, comprises the actions of:

computing the new lowermost intensity level as $\hat{B} = (1-\alpha)B$, wherein *B* is the originally computed lowermost intensity level, $\hat{B}$ is the new lowermost level and α is the safeness parameter which varies from 0 to 1; and

computing the new uppermost intensity level as $\hat{T} = \alpha(L-1) + (1-\alpha)T$, wherein *T* is the originally computed uppermost intensity level, $\hat{T}$ is the new uppermost level, *L* is the maximum possible intensity level and α is the safeness parameter.

9. (original) The process of Claim 8, wherein the process action of employing the originally computed lowermost and uppermost intensity levels and the new lowermost and uppermost intensity levels to establish a linear intensity correction transform, comprises an action of establish a linear intensity correction transform as $\hat{I} = aI + b$, where, *I* is the original pixel intensity level, $\hat{I}$ is the linearly expanded pixel intensity level, $a = (\hat{T} - \hat{B})/(T - B)$, and $b = (\hat{B}T - \hat{T}B)/(T - B)$.

10. (original) The process of Claim 1, wherein the process action of determining whether the linearly expanded intensity levels of the image pixels are evenly distributed,

comprises the actions of:

computing a histogram from the linearly expanded pixel intensity levels;

computing a 50 percentile (i.e., median) intensity level from the linearly expanded pixel intensity level histogram as the level wherein,

the sum of the number of pixels exhibiting a level within a prescribed range of levels extending from lowest level possible to the unknown median level, less one level, is less than the total number of pixels in the image multiplied by 0.5, and

the sum of the number of pixels exhibiting a level within a prescribed range of levels extending from lowest level possible to the unknown median level, is greater than or equal to the total number of pixels in the image multiplied by 0.5;

determining if the difference between the median intensity level and one half the maximum intensity level is less than or equal to the maximum intensity value multiplied by an intensity tolerance factor designed to compensate for the impact of noise on the pixels intensity levels; and

whenever it is determined that said difference is not less than or equal to said product, designating that the linearly expanded intensity levels of the image pixels are not evenly distributed.

11. (original) The process of Claim 1, wherein the process action of applying a correction factor to the linearly expanded intensity level of each pixel in the image to produce a corrected intensity value for each pixel and evenly distributed intensity levels, comprises the actions of:

computing a nonlinear gamma correction factor; and

applying the gamma correction factor to the linearly expanded pixel intensity level of each pixel in the image.

12. (original) The process of Claim 11, wherein the process action of computing the nonlinear gamma correction factor, comprises the actions of:

determining whether there is a significant peak in the lower side, upper side, or both sides of the linearly expanded pixel intensity level histogram, wherein a

peak is considered significant if the number of pixels assigned to the bins of the histogram around the peak pixel intensity level is larger than the average;

designating a significant peak determined to be in the lower side of the histogram that exhibits the lowest intensity level as the low peak and designating a significant peak determined to be in the upper side of the histogram that exhibits the highest intensity level as the high peak;

computing the 25 percentile, 50 percentile (i.e., median), and 75 percentile intensity levels from the linearly expanded pixel intensity level histogram;

establishing the gamma correction factor such that whenever the median intensity level is greater than the maximum possible level multiplied by, 0.50 plus the intensity tolerance factor,

the correction factor is set to 1 if the low peak is less than one-eighth the maximum possible intensity level and the median intensity level is greater than or equal to three-quarters the maximum possible intensity level,

the correction factor is set to the log of 0.125 divided by the log of the low peak divided by the maximum possible intensity level if the low peak is less than one-eighth the maximum possible intensity level and the median intensity level is less than three-quarters the maximum possible intensity level,

the correction factor is interpolated between 1 and a prescribed maximum value if the low peak is greater or equal to one-eighth the maximum possible intensity level and the median intensity level is greater than three-quarters the maximum possible intensity level, and the 75 percentile intensity level is between the maximum possible intensity level, and seven-eighths the maximum possible intensity level,

the correction factor is set to the log of 0.5 divided by the log of the median intensity level divided by the maximum possible intensity level if the low peak is greater or equal to one-eighth the maximum possible intensity level and the median intensity level is greater than three-quarters the maximum possible intensity level, and the 75 percentile intensity level is less than or equal to seven-eighths the maximum possible intensity level, and

otherwise the correction factor is set to 1; and

establishing the gamma correction factor such that whenever the median

intensity level is less than the maximum possible level multiplied by, 0.50 less the intensity tolerance factor,

the correction factor is set to 1 if the high peak is greater than seven-eighths the maximum possible intensity level,

the correction factor is set to $\gamma = 1 - \frac{Q_{0.25}}{L/8}(1 - \gamma_{\min})$ whenever the 25 percentile intensity level is less than or equal to one-eighth the maximum possible intensity level, wherein γ is the correction factor, L is the maximum possible intensity level, $Q_{0.25}$ is the 25 percentile intensity level and γ_{min} is a prescribed minimum correction factor value, and

otherwise the correction factor is set to the log of 0.5 divided by the log of the median intensity level divided by the maximum possible intensity level, except that the factor is limited to at least the prescribed minimum correction factor value.

13. (original) The process of Claim 12, wherein the process action of determining whether there is a significant peak, comprises the actions of:

determining if the sum of the number of pixels exhibiting a linearly expanded intensity level within a prescribed range of levels extending from the unknown peak intensity level, less a neighborhood size value which is equal to a prescribed number of levels, to the unknown peak level plus the neighborhood size value, is greater than or equal to the total number of pixels in the image multiplied by twice the neighborhood value plus 1 level, and divided by the highest possible intensity level; and

whenever said sum is greater than or equal to the total number of pixels in the image multiplied by twice the neighborhood value plus 1 level, and divided by the highest possible intensity level, designating that the intensity level represents a significant peak.

14. (original) The process of Claim 12, wherein the process action of computing the 25 percentile intensity level, comprises an action of:

computing the 25 percentile intensity level as the level wherein,

the sum of the number of pixels exhibiting a level within a

prescribed range of levels extending from lowest level possible to the unknown 25 percentile intensity level, less one level, is less than the total number of pixels in the image multiplied by 0.25, and

the sum of the number of pixels exhibiting a level within a prescribed range of levels extending from lowest level possible to the unknown 25 percentile intensity level, is greater than or equal to the total number of pixels in the image multiplied by 0.25.

15. (original) The process of Claim 12, wherein the process action of computing the 75 percentile intensity level, comprises an action of:

computing the 75 percentile intensity level as the level wherein,

the sum of the number of pixels exhibiting a level within a prescribed range of levels extending from lowest level possible to the unknown 75 percentile intensity level, less one level, is less than the total number of pixels in the image multiplied by 0.75, and

the sum of the number of pixels exhibiting a level within a prescribed range of levels extending from lowest level possible to the unknown 75 percentile intensity level, is greater than or equal to the total number of pixels in the image multiplied by 0.75.

16. (original) The process of Claim 12, wherein the process action of establishing the gamma correction factor by interpolating between 1 and the prescribed maximum value whenever the median intensity level is greater than the maximum possible level multiplied by 0.50 plus the intensity tolerance factor, and the 75 percentile intensity level is between the maximum possible intensity level, less one level and seven-eighths the maximum possible intensity level, comprises an action of setting the correction factor to $\gamma = 1 + \frac{L - Q_{0.75}}{L/8}(\gamma_{\max} - 1)$ wherein γ is the correction factor, L is the maximum possible intensity level, $Q_{0.75}$ is the 75 percentile intensity level and γ_{max} is the prescribed maximum correction factor value.

17. (original) The process of Claim 16, wherein the prescribed maximum correction value ranges between about 1.2 and 2.5.

18. (original) The process of Claim 17, wherein the prescribed maximum correction value is 1.5.

19. (original) The process of Claim 12, wherein the prescribed minimum correction value ranges between about 0.40 and 0.56.

20. (original) The process of Claim 19, wherein the prescribed minimum correction value is 0.48.

21. (original) The process of Claim 11, wherein the process action of applying the gamma correction factor to the linearly expanded pixel intensity level of each pixel in the image, comprises an action of applying the gamma correction factor to each linearly expanded pixel intensity value such that $\hat{I} = \left(\frac{I}{L-1}\right)^{\gamma}(L-1)$, wherein $\hat{I}$ is the corrected pixel intensity value, I is the linearly expanded pixel intensity value, γ is the correction factor, and L is the maximum possible intensity level.

22. (original) The process of Claim 21, further comprising a process action of, whenever the application of a gamma correction factor to the linearly expanded intensity level of each pixel in the image results in an overall brightening of the image, boosting the color saturation levels of each color channel of each pixel of the image by a desired amount.

23. (original) The process of Claim 22, wherein the process action of boosting the color saturation levels of each color channel of each pixel of the image by a desired amount whenever the application of a gamma correction factor to the linearly expanded intensity level of each pixel in the image results in an overall brightening of the image, comprises the actions of:

determining if the gamma correction factor is less than one indicating the image is brightened by its application; and

whenever the correction factor is less than one, boosting the color saturation level of each color channel of each pixel in the image by $\frac{1-\gamma}{1-\gamma_{\min}} \times 1.25$, wherein γ is the correction factor and γ_{min} is a prescribed minimum correction factor value.

24. (previously presented) A system for correcting the exposure of improperly exposed pixels of an image, comprising:

a general purpose computing device;

a computer program comprising program modules executable by the computing device, wherein the computing device is directed by the program modules of the computer program to,

compute a histogram of the intensity levels of the image pixels,

compute the lowermost and uppermost intensity levels that are consistent with the overall distribution of intensity levels in the image,

compute new lowermost and uppermost intensity levels that span the full dynamic intensity range available to a desired degree, and

employ the originally computed lowermost and uppermost intensity levels and the new lowermost and uppermost intensity levels to establish a linear intensity correction transform that maps the original intensity level of each pixel in the image to a linearly expanded intensity level,

apply the linear intensity correction transform to each pixel of the image,

determine whether the linearly expanded intensity levels of the image pixels are evenly distributed, and

whenever the linearly expanded intensity levels of the pixels are determined not to be evenly distributed, applying a gamma correction factor to the linearly expanded intensity level of each pixel in the image to produce a corrected intensity value for each pixel.

25. (original) The system of Claim 24, further comprising a program module for, whenever the application of a gamma correction factor to the linearly expanded intensity level of each pixel in the image results in an overall brightening of the image, boosting the color saturation levels of each color channel of each pixel of the image by a desired amount.

26. (previously presented) The system of Claim 25, wherein the program module for boosting the color saturation levels of each color channel of each pixel of the image by a desired amount, comprises an action of varying the degree to which the color saturation levels of the image pixels are boosted between 25 percent to less than 1 percent, in proportion to the degree of brightening.

27. (original) The system of Claim 24, wherein the program module for employing a gamma correction factor to the linearly expanded intensity level of each pixel in the image to produce a corrected intensity value for each pixel, comprises sub-modules for:

computing a nonlinear gamma correction factor; and

applying the gamma correction factor to the linearly expanded pixel intensity level of each pixel in the image.

28. (original) The system of Claim 27, wherein the sub-module for computing the nonlinear gamma correction factor, comprises sub-modules for:

determining whether there is a significant peak in the lower side, upper side, or both sides of the linearly expanded pixel intensity level histogram, wherein a peak is considered significant if the number of pixels assigned to the bins of the histogram around the peak pixel intensity level is larger than the average;

designating a significant peak determined to be in the lower side of the histogram that exhibits the lowest intensity level as the low peak and designating a significant peak determined to be in the upper side of the histogram that exhibits the highest intensity level as the high peak;

computing the 25 percentile, 50 percentile (i.e. median), and 75 percentile intensity levels from the linearly expanded pixel intensity level histogram;

establishing the gamma correction factor such that whenever the median intensity level is greater than the maximum possible level multiplied by, 0.50 plus the intensity tolerance factor,

the correction factor is set to 1 if the low peak is less than one-eighth the maximum possible intensity level and the median intensity level is greater than or equal to three-quarters the maximum possible intensity level,

the correction factor is set to the log of 0.125 divided by the log of the low peak divided by the maximum possible intensity level if the low peak is less than one-eighth the maximum possible intensity level and the median intensity level is less than three-quarters the maximum possible intensity level,

the correction factor is interpolated between 1 and a prescribed maximum value if the low peak is greater or equal to one-eighth the maximum possible intensity level and the median intensity level is greater than three-quarters the maximum possible intensity level, and the 75 percentile intensity level is between the maximum possible intensity level, and seven-eighths the maximum possible intensity level,

the correction factor is set to the log of 0.55 divided by the log of the median intensity level divided by the maximum possible intensity level if the low peak is greater or equal to one-eighth the maximum possible intensity level and the median intensity level is greater than three-quarters the maximum possible intensity level, and the 75 percentile intensity level is less than or equal to seven-eighths the maximum possible intensity level, and

otherwise the correction factor is set to 1; and

establishing the gamma correction factor such that whenever the median intensity level is less than the maximum possible level multiplied by, 0.50 less the intensity tolerance factor,

the correction factor is set to 1 if the high peak is greater than seven-eighths the maximum possible intensity level,

the correction factor is set to $\gamma = 1 - \frac{Q_{0.25}}{L/8}(1-\gamma_{\min})$ whenever the 25

percentile intensity level is less than or equal to one-eighth the maximum possible intensity level, wherein γ is the correction factor, L is the maximum possible intensity level, $Q_{0.25}$ is the 25 percentile intensity level and γ_{min} is a prescribed minimum correction factor value, and

otherwise the correction factor is set to the log of 0.5 divided by the log of the median intensity level divided by the maximum possible intensity level, except that the factor is limited to at least the prescribed minimum correction factor value.

29. (original) The system of Claim 27, wherein the sub-module for applying the gamma correction factor to the linearly expanded pixel intensity level of each pixel in the image, comprises an action of applying the gamma correction factor to each linearly expanded pixel intensity value such that $\hat{I} = \left(\frac{I}{L-1}\right)^{\gamma}(L-1)$, wherein $\hat{I}$ is the corrected pixel intensity value, I is the linearly expanded pixel intensity value, γ is the correction factor, and L is the maximum possible intensity level.

30. (original) A computer-readable medium having computer-executable instructions for performing the process actions recited in Claim 1.